

CLAIMS

1. An isolated capsaicin receptor polypeptide.
- 5 2. The capsaicin receptor polypeptide of Claim 1, wherein the polypeptide is a VR1 subtype.
3. The capsaicin receptor polypeptide of Claim 1, wherein the polypeptide is a VR2 subtype.
4. The capsaicin receptor polypeptide of Claim 1, wherein the polypeptide comprises an amino
10 acid sequence selected from the group consisting of SEQ ID NO:2, 4, 9, 11, 23, 25, 27, 34, or 36.
5. An isolated polynucleotide sequence encoding a capsaicin receptor polypeptide of claim 1.
6. The polynucleotide sequence of Claim 5, wherein the sequence encodes a VR1 subtype.
7. The polynucleotide sequence of Claim 5, wherein the sequence encodes a VR2 subtype.
8. The isolated polynucleotide sequence of Claim 5, wherein the sequence comprises a
20 sequence selected from the group consisting of SEQ ID NO:1, 3, 5, 6, 7, 8, 10, 20, 21, 22, 24, 26, 33, or 35.
9. A recombinant expression vector comprising the polynucleotide sequence of Claim 5.
10. A recombinant host cell containing the polynucleotide sequence of Claim 5.
- 25 11. A method for producing the capsaicin receptor polypeptide of Claim 1, the method comprising
the steps of:
a) culturing a recombinant host cell containing a capsaicin receptor polypeptide-encoding
polynucleotide sequence under conditions suitable for the expression of the polypeptide; and
b) recovering the polypeptide from the host cell culture.
- 30 12. An isolated antibody that specifically binds a capsaicin receptor polypeptide of claim 1.

13. A method for identifying compounds that bind a capsaicin receptor polypeptide, the method comprising the steps of:

contacting a capsaicin receptor polypeptide with a test compound; and
detecting specific binding of the test compound to the capsaicin receptor polypeptide.

14. The method of claim 13, wherein said detecting is by detecting of an alteration of intracellular calcium concentration in the capsaicin receptor-expressing host cell.

15. A method for detecting a vanilloid compound in a sample, wherein the vanilloid compound has activity in binding a capsaicin receptor polypeptide, the method comprising the steps of:

contacting a sample suspected of containing a vanilloid compound with a eukaryotic host cell expressing a capsaicin receptor polypeptide;
detecting an alteration of a cellular response associated with capsaicin receptor activity in the capsaicin receptor-expressing host cell.

16. The method of claim 15, wherein the cellular response associated with capsaicin receptor activity is an increase in intracellular calcium concentration.

17. A pharmaceutical composition comprising a substantially purified capsaicin receptor polypeptide and a suitable pharmaceutical carrier.

18. A non-human transgenic animal model for capsaicin receptor gene function wherein the transgenic animal is characterized by having an alteration in capsaicin receptor function relative to a normal animal of the same species.

19. A method of screening for biologically active agents that modulate capsaicin receptor function, the method comprising:

combining a candidate agent with any one of:

- (a) a mammalian capsaicin receptor polypeptide;
- (b) a mammalian capsaicin receptor-related polypeptide;
- (c) a cell containing a nucleic acid encoding a mammalian capsaicin receptor polypeptide;
- (d) a cell containing a nucleic acid encoding a mammalian capsaicin receptor-related polypeptide; or
- (e) a non-human transgenic animal model for function of a capsaicin receptor gene comprising one of: (i) a knockout of a capsaicin receptor gene; (ii) an exogenous and stably transmitted mammalian capsaicin

receptor gene sequence; or (iii) a capsaicin receptor promoter sequence operably linked to a reporter gene;
and

determining the effect of said agent on capsaicin receptor function.

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